CALIFORNIA
ENERGY
COMMISSION

GRANT SOLICITATION

BUILDING ENERGY RESEARCH GRANT (BERG) PROGRAM

Solicitation Number PON-08-002

Subject Area: Building End-Use Energy Efficiency Program

APPLICATION MANUAL

October 2008

Arnold Schwarzenegger, *Governor*

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GRANT SOLICITATION AND APPLICATION PACKAGE

Public Interest Energy Research (PIER)
Buildings Energy Research, Development & Demonstration (RD&D)
Subject Area: Buildings End-Use Program

1. Release Date October 8, 2008

2. Proposal Due Date December 3, 2008 at 4:00 p.m. PST

3. Purpose of Program

The Building Energy Research Grant (BERG) Program is a component of the Public Interest Energy Research (PIER) Program at the California Energy Commission (Energy Commission). The purpose of the PIER Program is to provide benefit to California electric and gas ratepayers by funding energy research, development and demonstration (RD&D) projects that are not adequately provided for by competitive and regulated energy markets. Approximately $62 million per year is collected from electricity ratepayers for the electricity PIER Program, and $24 million is collected from gas ratepayers for the natural gas PIER Program. This is a competitive grant solicitation where Applicants compete based on selection criteria and are scored and ranked based on those criteria. Highest scoring Applications that meet the minimum qualifications will be recommended for funding.

The BERG Program is a component of the Buildings End-Use Energy Efficiency Program, one of the seven major program areas within PIER. The Buildings End-Use Energy Efficiency Program funds applied research that:

- Improves building affordability and value through the development of cost-effective, energy efficient building products and strategies.
- Reduces energy costs through the development and use of energy efficient consumer options for reducing or managing loads.
- Facilitates the construction and operation of buildings that are energy efficient, healthy and comfortable.

Research funded through the BERG Program will be consistent with these objectives. The BERG Program plans to issue funding solicitations semi-annually. One objective of the BERG Program is to award as many promising research grants as possible under each solicitation.

4. Availability of Solicitation Documents and Information

This solicitation and all supporting documents and forms can be found at http://www.energy.ca.gov/contracts/index.html under “Current Solicitations.” Interested parties may also register on the electronic mailing list on this webpage to receive notifications of any changes to this solicitation.

For those parties without Internet access, copies of solicitation documents and information can be obtained by contacting:

Grants and Loans Office
California Energy Commission
1516 Ninth Street, MS-43
Sacramento, CA 95814
Telephone: (916) 654-4381

In addition, interested parties may request to be added to the mailing notification list to receive changes made to this solicitation.

5. Eligible Projects

Proposals should reflect a comprehensive understanding of the current state of science in the chosen targeted research area. These projects must propose research that is not adequately covered by the competitive market. Successful proposals should clearly describe and target residential and/or commercial building energy efficiency in California. Proposals must provide a market connection for the proposed technology and a potential benefit to electricity and/or natural gas ratepayers in California.

The targeted research areas for this solicitation are as follows:

- Building Envelope
- HVAC, Controls and Diagnostics
- Lighting and Lighting Controls
- Appliances, Electronics and Miscellaneous Equipment
- Whole Building and Community Systems Integration

See Attachment F for details on targeted research areas.

6. Eligible Applicants

This is an open solicitation seeking proposals from public and private entities and individuals actively involved in Building Energy Efficiency research. To be eligible, Applicants must present a team with demonstrated capabilities in successful completion of research projects.

Applicants are allowed to submit multiple proposals. Entities and individuals are limited to receiving funding for only one proposal per solicitation. Academic institutions, academic foundations, and National Laboratories are limited to receiving funding for one proposal per principal investigator in a given solicitation. Multiple projects cannot be proposed in a single application.

BERG grant Recipients (meaning Principal Investigators in the case of academic institutions, academic foundations and National Laboratories) are allowed only one active BERG grant at a time and a person cannot serve as a Principal Investigator or Project Manager on more than one BERG grant project at a time. BERG grant

Recipients cannot submit another proposal for consideration until the Energy Commission has accepted and approved the Final Report on the Recipient's latest BERG project.

While there is no requirement for Applicants to reside in California or that the work be performed in California, the proposed research must be clearly relevant to California's electric and/or natural gas ratepayers. California business entities as well as non-California business entities conducting intrastate business in California are required to register and be in good standing with the California Secretary of State to enter into a funding agreement with the Energy Commission. If not currently registered with the California Secretary of State, Applicants are encouraged to contact the Secretary of State's Office as soon as possible to avoid potential delays in beginning the project if successful under this solicitation. For more information, contact the California Secretary of State via their website at www.sos.ca.gov.

8. Funding Information

Approximately $500,000 of FY 2008/09 PIER Electricity and $500,000 of FY 2008/09 Natural Gas funding is available under this solicitation for grant awards. A maximum of $300,000 is available to Applicants per grant project. Match funding is encouraged but not required for selection.

9. Payment of Prevailing Wages

Some projects submitted under this solicitation might be considered public works pursuant to the California Labor Code. If the project includes public work, prevailing wage is required. The California Department of Industrial Relations (DIR) has jurisdiction to decide whether a particular project is or is not a public work. If the project involves construction, alteration, demolition, installation, repair or maintenance work, it probably would be considered by DIR to be a public work. A few of the activities that would probably lead DIR to find that the project involves public works include: cement work, site preparation such as grading, surveying, electrical work such as wiring, and carpentry work. Certain workers are entitled to prevailing wage such as operating engineers, surveyors, carpenters, laborers, etc. However, other trades are not entitled to prevailing wage such as engineers and project superintendents.

Applicants are encouraged to determine if the proposed project involves public works as soon as possible. In order to determine if the proposed project involves public works, the Applicant will need to contact DIR. If the Applicant has not received a determination from DIR that the project is not a public work, the budget must provide for the payment of prevailing wages. Please indicate whether the proposed budget includes prevailing wage.

If the proposed project is a public work, DIR maintains a list of covered trades and the applicable prevailing wage. The agreement will include the requirements for public works, such as paying prevailing wage, keeping payroll records, complying with working hour requirements, and apprenticeship obligations. See the Special Condition

(Attachment I) regarding Prevailing Wage, and the accompanying form (Attachment J) for more information.

For detailed information about prevailing wage and the process to determine if the proposed project is a public work, see Attachment K.

10. California Environmental Quality Act (CEQA)

Some of the projects selected for funding may meet the definition of a "project" for purposes of CEQA (see Public Resources Code section 21000 et seq.) If this occurs, the Energy Commission's Legal Staff will review the project to determine whether an exemption applies that would prevent further actions under CEQA. If no exemption applies, certain CEQA requirements (e.g., preparation of a negative declaration or environmental impact report) will have to be met prior to the Energy Commission approving the grant. The Applicant will have to pay the cost for these activities. Please refer to Title 20, California Code of Regulations, Chapter 6, Article 1, including section 2308.

11. Selection of Projects and Award Process

The following process will be utilized to recommend project(s) for funding:

1. Based on the proposals submitted, a scoring committee will score the projects using the scoring criteria described in Attachment G.

2. The scoring committee may conduct optional interviews for clarification purposes.

3. A minimum score of 70 (out of 100) is required to be eligible for funding.

4. Projects receiving a score of 70 or more will be ranked according to their overall score.

5. Passing project(s) will be recommended for funding starting with the highest ranked project until all funds are exhausted.

6. The Energy Commission reserves the right to negotiate with the Applicant(s) to modify the project scope, level of funding, or both.

7. If the Energy Commission is unable to successfully negotiate and execute a funding agreement with a successful Applicant, the Energy Commission, at its sole discretion, reserves the right to cancel the pending award and fund the next highest ranked eligible project proposal received under this solicitation.

8. A Notice of Proposed Awards will be released.

9. Project(s) recommended for funding will be scheduled and heard at an Energy Commission Business Meeting.

If approved at an Energy Commission Business Meeting:

10. Public agencies and non-profit organizations that receive funding under this solicitation must provide an authorizing resolution approved by their governing authority to enter into an Agreement with the Energy Commission.

11. A Grant Agreement, which includes applicable Terms and Conditions*, will be written and sent to the Recipient(s) for review, approval, and signature.

12. Once returned to the Energy Commission, the Energy Commission will fully execute the Grant Agreement. Recipient(s) are approved to begin the project only after full execution of the Grant Agreement.

* **The *PIER Grant Terms and Conditions can be found at http://www.energy.ca.gov/contracts/index.html as part of this solicitation package. Please note, however, the Energy Commission reserves the right to modify the terms and conditions prior to executing grant agreements.***

12. Schedule of Proposal and Award Process

Release of Program Opportunity Notice	October 8, 2008
Proposal Workshop (via in person participation, teleconference, WebEx)	October 29, 2008, 10:00 a.m.
Deadline to Submit Questions	November 6, 2008
Post Questions and Answers to Website	November 14, 2008
Deadline to Submit Proposals	**December 3, 2008 4:00 p.m. PST**
Interview Applicants (if necessary)	January 5-8, 2009
Post Notice of Proposed Awards	*Estimated* January2009
Approval of Awards at Energy Commission Business Meeting	*Estimated* March – April 2009

13. Proposal Workshop

A proposal workshop will be held through in-person participation, WebEx, and conference call. Participation by prospective Applicants is optional. Please call (916) 651-2074 or refer to the Energy Commission's website at http://www.energy.ca.gov/contracts/index.html to confirm the date and time.

Public participation may be done in-person, via WebEx, and/or conference call.

Date: October 29, 2008
Time: 10:00 AM, Pacific Standard Time
Location: California Energy Commission
Hearing Room A, First Floor
1516 Ninth Street
Sacramento, California 95814

To join the WebEx meeting, click the following link and enter the meeting number and password provided below:

1. Please go to https://energy.webex.com and enter the unique meeting number: 926 246 625
2. When prompted, enter your information and the following meeting password: meeting@10
3. After you login, a prompt will appear on-screen for you to provide your phone number. In the Number box, type your area code and phone number and click OK to receive a call back on your phone for the audio of the meeting. International callers can use the "Country/Region" button to help make their connection.

COMPUTER LOGON FOR CALLERS WITH AN
EXTENSION PHONE NUMBER, ETC.
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1. Please go to https://energy.webex.com and enter the unique meeting number: 926 246 625
2. When prompted, enter your information and the following meeting password: meeting@10
3. After you login, a prompt will ask for your phone number. CLICK CANCEL.
4. Instead call 1-866-469-3239 (toll-free in the U.S. and Canada). When prompted, enter the meeting number above and your unique Attendee ID number which is listed in the top left area of your screen after you login. International callers can dial in using the "Show all global call-in numbers" link (also in the top left area).

TELEPHONE ONLY (NO COMPUTER ACCESS)
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1. Call 1-866-469-3239 (toll-free in the U.S. and Canada) and when prompted enter the unique meeting number above. International callers can select their number from https://energy.webex.com/energy/globalcallin.php

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TECHNICAL SUPPORT

For help with problems or questions trying to join or attend the meeting, please call WebEx Technical Support at 1-866-229-3239.

System Requirements: To see if your computer is compatible, visit http://support.webex.com/support/system-requirements.html

Meeting Preparation: The playback of UCF (Universal Communications Format) rich media files requires appropriate players. To view this type of rich media files in the meeting, please check whether you have the players installed on your computer by going to https://energy.webex.com/energy/systemdiagnosis.php

IMPORTANT NOTICE: This WebEx service includes a feature that allows audio and any documents and other materials exchanged or viewed during the session to be recorded. By joining this session, you automatically consent to such recordings. If you do not consent to the recording, do not join the session.

14. Proposal Requirements

It is required that proposals contain the following elements. ***Failure to include these elements WILL result in your proposal receiving a lower score and MAY result in your proposal being rejected and not eligible for funding.***

1. Proposal Cover Page: ***Attachment A*** must be completed in full and utilized as the proposal cover page.

2. Executive Summary of the Project: The maximum length of the Executive Summary is two (2) pages and should include project description; project objective(s); and quantitative and measurable goals to be achieved.

3. Project Narrative: A detailed discussion of how the proposed project addresses each of the scoring criteria as described Attachment G. Provide sufficient detail so that reviewers will be able to evaluate the proposal against each of the criteria.

    - Description of the state-of-the-art of the proposed technology and the current status of the research in the area of your project, barriers to advancement of the technology and why your project is the next logical step to advance the state-of-the-art of the technology or increase the penetration of the technology in the marketplace.
    - Description of quantified targets, goals and market application. Explain the target market and the size of the market where this application can be applied.
    - Anticipated direct and indirect benefits to California electricity and/or natural gas ratepayers.

- Show project collaboration and coordination, especially the pathway to wider use and commercialization of this technology.
- Any other significant factors which enhance or clarify the value of the proposal, including highlights of the previous work and innovative features related to the proposed project.

4. Biographies: Short biographies of the Principal Investigator (PI) and key research partners (individuals in your organization or subcontractors), emphasizing experience related to activities to be performed in the project.

5. Work Statement: Applicants must include a work statement following the template specified in ***Attachment B***. The work statement shall include a task-by-task description of the proposed project including a process flow diagram. Include a one-sentence goal for each task, a list of the activities to be performed, product(s) to be produced, and the duration of the task.

6. Budget: Project budget information, including the source(s) of match funding, a justification for the share of match funding, and the reasons why this project is not likely to be funded by competitive or regulated markets. Applicants must use the forms contained in ***Attachment C*** which includes the following: Category Budget, Budget Details, Summary Budget by Task, PIER Funding by Task, and Match Funding by Task. The budget form is an Excel spreadsheet and is posted on the Energy Commission website at http://www.energy.ca.gov/contracts/index.html as part of this solicitation package.

7. Schedule of Products and Due Dates: Applicants must complete and include a Schedule of Products and Due Dates following the template specified in ***Attachment D***. The Schedule of Products and Due Dates must be consistent with the information provided in the submitted Work Statement.

8. Status of Research Effort: Applicants must complete and include answers to the questions included in ***Attachment E*** – Status of Research Effort.

15. Proposal Guidelines

Proposals should adhere to the following guidelines. ***Failure to adhere to these guidelines MAY result in your proposal being rejected and not eligible for funding.***

1. Limit proposals to a maximum length of 50 pages.

2. Use a standard 12-point font and 1-inch or larger page margins and number the pages.

3. Project duration cannot be more than three years.

4. All project expenditures (match share and reimbursable) must be expended within the approved term of the funding agreement.

5. Maximum PIER funding requests per project cannot exceed $300,000.

6. Match funding is not required. However, the level of match funding provided is a factor in the scoring criteria.

7. The budget should allow for the expenses of a Kick-off Meeting, at least two Critical Project Review meetings, and a Final Meeting. It is anticipated that meetings will be conducted at the Energy Commission located in Sacramento, CA.

8. The budgets should allow for the preparation and submission of monthly progress reports (2-4 pages each) during the approved term of the agreement, and a final report that follows Energy Commission guidelines which can be found at: http://www.energy.ca.gov/contracts/pier/contractors/index.html.

9. The purchase of equipment (items with a unit cost greater than $5,000 and a useful life greater than one year) with PIER funds is discouraged due to disposition requirements associated with the equipment. There are no disposition requirements for equipment purchased with match share funding.

10. The budget must reflect estimates for ***actual*** costs to be incurred during the approved term of the project. The Energy Commission can only approve and reimburse expenditures for actual costs that are properly documented in accordance with the PIER Grant Terms and Conditions.

11. The budget must ***NOT*** include any profit from the proposed project, either as a reimbursed item or as match share. In accordance with the PIER Grant Terms and Conditions, NO PROFIT IS ALLOWED UNDER GRANT AGREEMENTS. Please review the PIER Grant Terms and Conditions for additional restrictions and requirements.

12. Provide hard copies of one (1) original and six (6) copies of the proposal and a CD containing all the documents related to the proposal. The documents do not need to be bound; binder clips are acceptable. The original must be signed by an authorized representative of your organization.

16. Confidential Information

No confidential information will be accepted during the proposal and selection phase of this solicitation. If any confidential information is submitted, the entire proposal will be rejected and will not be eligible for funding. Proposals containing confidential information will be returned to the Applicant.

While discouraged, Applicants may ***propose*** to deliver confidential products during the course of the project if funded. If necessary, instructions on submitting confidential products will be provided by the Energy Commission prior to executing the Grant Agreement.

17. Submission Requirements

One (1) original and six (6) copies of the grant proposal **must be received no later than the due date and time specified above**. Mail completed grant proposals to:

California Energy Commission
Grants and Loans Office
Attn: BERG Program
1516 Ninth Street, MS-1
Sacramento, CA 95814

Postmark dates of mailing, electronic mail (E-mail), and facsimile (Fax) transmissions are not acceptable in whole or in part under any circumstances. The Energy Commission will reject all proposals not received by the Energy Commission's Grants and Loans Office by the designated deadline.

Applications that do not include at least one (1) signed original and six (6) copies or have not been received by the Energy Commission by the specified due date and time will not be considered for funding.

18. Grounds for Rejection

Proposals ***WILL*** be rejected and not considered for funding if:

1. The proposal is not received by the Energy Commission's Grants and Loans Office by the stated due date and time.

2. The proposal contains any confidential information.

3. The proposal proposes a project that has already been addressed or is being addressed.

4. The applicant already has an active BERG agreement as defined under Eligible Applicants.

5. Research has no clear market connection or does not address an issue or problem relevant in California.

Proposals ***MAY*** be rejected and not considered for funding if:

1. The proposal does not address each element listed under "Proposal Requirements."

2. The proposal does not adhere to the guidelines listed under "Proposal Guidelines."

19. Cancellation or Amendment of this Solicitation

If it is in the State's best interest, the Commission may amend or cancel this Grant. It is the policy of the Commission not to solicit proposals unless there is a bona fide intention to award an Agreement. The Commission reserves the right to do any of the following:

- Cancel this solicitation.
- Revise the amount of funds available under this solicitation.
- Amend or revise this solicitation.
- Reject any or all proposals received in response to this solicitation.

20. Whom do I contact for more information and Questions?

Questions regarding this solicitation and the BERG Program should be sent via email or letter to:

California Energy Commission
Attn: Chris Scruton
1516 Ninth Street, MS-49
Sacramento, CA 95814
cscruton@energy.state.ca.us

Questions submitted to the Energy Commission by the specified deadline will be answered and posted on the Energy Commission website at www.energy.ca.gov/contracts as part of this solicitation package. The person and organization submitting a question will not be identified.

21. Attachments

A. Grant Application Cover Page
B. Sample Statement of Work Format and Instructions
C. Budget Forms
D. Schedule of Products and Due Dates
E. Status of Research Effort
F. Targeted Research Areas
G. Evaluation/Scoring Criteria
H. PIER Terms and Conditions
I. Prevailing Wage Special Condition Template
J. Prevailing Wage Compliance Certificate
K. Prevailing Wage Compliance Qs & As

Attachment A

Application Cover Page

Applicants should refer to the Application Cover Page Template which is posted at www.energy.ca.gov/contracts as part of this solicitation package. The document is a Microsoft Word document. Applicants should use the Attachment A template when completing the proposal cover page for submittal to the Energy Commission under this solicitation.

Attachment B

Work Statement Template

Applicants should refer to the Work Statement Template which is posted at www.energy.ca.gov/contracts as part of this solicitation package. The document is a Microsoft Word document. Applicants should use the Attachment B template when completing the work statement for submittal to the Energy Commission under this solicitation.

Attachment C

Budget

Applicants should refer to the Budget Template which is posted at www.energy.ca.gov/contracts as part of this solicitation package. The document is a Microsoft Excel document. Applicants should use the Attachment C template when completing the budget for submittal to the Energy Commission under this solicitation.

Attachment D

Schedule of Products and Due Dates

Applicants should refer to the Schedule of Products and Due Dates Template which is posted at www.energy.ca.gov/contracts as part of this solicitation package. The document is a Microsoft Excel document. Applicants should use the Attachment D template when completing the schedule of products and due dates for submittal to the Energy Commission under this solicitation.

Attachment E

Status of Research Effort

Applicants should refer to the Status of Research Effort questionnaire which is posted at www.energy.ca.gov/contracts as part of this solicitation package. The document is a Microsoft Word document. Applicants should complete the Attachment E form and submit it to the Energy Commission as part of the proposal.

Attachment F

Targeted Research Areas

1) Building Envelope

Building envelopes consist of the windows, walls, roofs, foundations, and other elements that comprise building exteriors and/or enclose conditioned spaces. The building envelope is a significant factor influencing the heating, cooling, ventilation and lighting requirements of buildings and resultant energy consumption. Building envelopes have impacts on peak loads and are therefore important in improving power system reliability.

Substantial energy savings can be achieved through improvements in the materials, components, and systems that make up building envelopes and in the related design and construction processes. There is a need for improved envelope performance in terms of heat transfer, infiltration, and daylight availability through advanced component technology, systems integration and improved understanding of the basic processes governing envelope performance. The impact of load shifting and thermal energy storage also needs to be better understood. Minimizing environmental damage from creation and transportation of building materials is also important.

Because new construction comprises only a few percent of the building stock each year, improving the performance of existing buildings is critical to making a substantial impact on overall energy consumption. Envelope retrofits can have a dramatic impact on energy consumption, but such retrofits are particularly challenging due to higher costs and lack of proper diagnostic tools.

Research topics include but are not limited to:

Efficient Components, Retrofit Techniques and Building Systems

- Cost-effective remediation and retrofit systems for envelopes of existing buildings to improve R-values, reduce air infiltration, facilitate moisture control, and enhance durability.
- Improved methods, materials and systems for building envelopes, with consideration of user comfort, environmental impacts, life-cycle energy, durability and performance.
- Daylighting and fenestration systems components, systems, test procedures, and design integration.

Design and Analysis Tools

- Software tools and standards-related analysis to facilitate adoption of cool exteriors, passive solar, thermal mass, and building orientation.

- Field studies of envelope performance of existing buildings in regards to energy use, durability, and performance.
- Design guidelines, tools, analysis, and test procedures for daylighting, including louvers and light shelves, top-lighting, and side-lighting.

2) HVAC, Controls and Diagnostics

Population growth and energy demand in hotter inland areas of California are intensifying the need for energy efficient ways to provide comfortable interiors. Increasing awareness of indoor air quality, especially in more tightly sealed homes with abundant sources of chemical out-gassing, drives a need for reliable ventilation. The mild California climate also provides opportunities for ventilation cooling which can dilute contaminants, though a better understanding of complex issues is needed.

The developing market for "zero energy homes" and low energy commercial buildings will provide opportunities for new space conditioning technologies and products. Furthermore, products optimized for national markets, often designed for high humidity and large heating loads, are not optimal solutions for space conditioning in the hot, dry western climate typical of California.

Research topics include but are not limited to:

Design and Analysis Tools

- Integration of natural and low energy ventilation with complementary thermal comfort systems. This includes tall buildings which require design guidance and resolution of fire code issues.
- Advanced simulation tools for thermal, visual and acoustic comfort analysis.
- Ventilation, indoor air quality, and thermal comfort design guidance for commercial and residential buildings.

Monitoring and Characterization

- Monitoring actual air conditioning (AC) loads for demand analysis and standards validation with respect to Seasonal Energy Efficiency Ratio (SEER), thermal distribution systems, refrigerant charge and airflow programs, automated fault detection, economizer functionality, CO_2-based demand control ventilation, thermostats and demand shedding programs.
- Air conditioner and heat pump database analysis with respect to actual performance in hot/dry conditions.
- Market-oriented strategies for capturing energy and peak demand reductions with pre-cooling strategies, variable air volume, natural ventilation, ventilation cooling, radiant cooling, displacement ventilation and under floor air distribution.
- Ventilation, indoor air quality and thermal comfort performance monitoring leading to code and standards enhancements for commercial and residential buildings.
- Consumer behavior and expectations with respect to thermal space conditions.
- Characterization of actual component performance through testing.

Advanced Components, Systems and Technologies

- Efficient thermal distribution systems, including low leakage, low resistance duct systems, hydronic systems, and refrigerant-based distribution systems.
- Control and fault-detection systems, including integration of natural ventilation, communicating thermostats and demand shedding, CO_2-based demand control ventilation, and refrigeration system and economizer diagnostics.
- Lower energy heating and cooling technology development, including hot-dry climate optimized components and systems, radiant components and systems, natural, under-floor, and displacement ventilation components and systems, conventional mixed-air systems, more efficient and cost-effective gas furnaces.

3) Lighting and Lighting Controls

In the California commercial sector, lighting consumes 39% of electric energy and demands 33% of power at system peak. In the residential sector, lighting consumes 28% of electric energy and demands 12% of power at system peak. Legislation in California and around the world is targeting lighting for large energy reductions. Improvements in light sources, fixtures, controls, and greater use of natural daylight have great potential for reducing lighting demand, but much more needs to be known about present uses of lighting, consumer preferences and behavior, controls integration, promising basic technologies, and application of advanced design.

Research topics include but are not limited to:

Design and Analysis Tools

- Lighting design software, including controls, and integration of natural daylight.
- Commissioning and diagnostic tools and methods.
- Test methods for advanced lighting products.

Monitoring and Characterization

- Field performance and standards enhancement proposals for lighting products.
- Appropriate lighting levels and technologies in commercial applications.
- Energy and environmental impacts of advanced fluorescent and solid-state lighting products.
- Behavior and expectations with respect to lighting and controls.

Advanced Components, Systems and Technologies

- Luminaries, lamps, and controls, including niche applications.
- Control interface standards.
- Bi- or multi-level and dimmable controls for specific applications.
- Applications for advanced light sources.

4) Appliances, Electronics and Miscellaneous Equipment

A wide variety of equipment is covered in this category, including refrigeration, consumer and commercial cooking and laundry appliances, dishwashing equipment, water heating equipment and others. Residential and commercial appliances consume approximately 28% of the energy used in buildings. Some types of equipment are covered by Federal efficiency standards or California Title 20 standards. Others, for example home entertainment and communication products, have neither minimum performance standards nor information available to consumers about how much energy they use. Increasing use of this equipment, especially following the changeover to digital broadcasting, has important implications for plug load energy use.

High efficiency product options are currently not available for some categories of residential and commercial appliances. New technologies are needed to cost-effectively attain higher efficiency levels in both new and older types of appliances, such as water and space heaters. Emerging technological, market and regulatory trends and drivers both enable and necessitate the development of new equipment and applications, including wireless networking, combined heat and power equipment, demand response technology, and time-dependent electricity pricing.

Research topics include but are not limited to:

Design and Analysis Tools

- Best practice guides for energy efficient electronic circuit design.
- Specification resources for energy efficient appliances and equipment.
- Design guides for commercial kitchen appliances and cooking systems.
- Test procedures for water heating and water consuming equipment.

Monitoring and Characterization

- Monitoring standby losses in appliances.
- Trends in plug loads and strategies for energy management.
- Consumer desires, expectations and behavior related to appliances, consumer equipment and water use leading to strategies to reduce resource consumption.
- Energy use related to appliances in commercial kitchens, healthcare facilities, supermarkets and other energy intensive end use types.

Advanced Components, Systems and Technologies

- Efficient commercial cooking and water heating equipment and systems.
- Low power electronic and display technologies.
- Control systems to reduce plug loads.
- Smarter, demand-responsive appliances.
- Information systems for consumer awareness, including energy use feedback.
- Non-chemical water treatment systems.
- Advanced systems for irrigation controls.

5) Whole Building and Community Systems Integration

Whole building performance is strongly influenced by components and systems but integrated design can produce buildings that perform much better (or worse) than their components would imply. The highly ambitious targets of net zero energy residential and commercial buildings will require masterful design integration of natural lighting, ventilation, renewable energy sources, and presumably low-environmental impact materials combined with use of energy and resources in the most effective way possible.

To reach the implied goals of an advanced, low-carbon society will require integration of highly efficient buildings in ways that maximize the efficiency of public infrastructure, including transportation, water, sewerage, power and communications, natural gas, food and material supplies. These communities must also provide the amenities, services, social and economic opportunities and natural spaces which people expect and require, but in a way which minimizes adverse impacts on the environment.

Water use for landscape irrigation, washing and cooking is essential, but anecdotal and measured data show many problems with water use in California buildings, especially with regard to hot water use. In anticipation of an increasingly arid future, it is imperative that Californians use water more efficiently.

Research topics include but are not limited to:

Design and Analysis Tools

- Best practice guides for whole building design for a variety of end use types, including single and multi-family residences, retail and institutional buildings, restaurants, supermarkets, health care facilities, and industrial buildings.
- Parametric analysis tools for energy and resource use relative to various community designs, including impacts of cool (high albedo) surfaces, vegetation, renewable energy sources, and low-impact transportation networks.
- Best practice design guides and analysis tools for hot water systems, including integration of solar and waste heat recovery, including consideration of code and standards enhancements.

Monitoring and Characterization

- Monitoring actual energy and resource use in very low net energy buildings.
- Monitoring and analysis of resource impacts across whole community types.
- Monitoring which leads to advanced code change and legislation proposals in support of California policy goals.
- Case studies of integrated system building and community designs which provide multi-dimensional performance and efficiency improvements.
- Monitoring and analysis of water use as related to component and system design, including single and multi-family residential and commercial applications.

Advanced Components, Systems and Technologies

- Specific components which enable whole building energy improvements.
- Development and testing of advanced whole building systems.
- Community-wide system technological developments which lead to improved performance, higher efficiency, and reduced environmental impacts.
- Gray water use and recovery systems, including code enhancements.

Attachment G

Scoring Evaluation/Criteria

Proposal Scoring

Overview of the Technical Evaluation Scoring Process

Proposals must fully comply with the Proposal Requirements and follow the Proposal Guidelines to be eligible for the technical evaluation scoring by the Technical Evaluation Committee. The Technical Evaluation Committee may consist of Energy Commission staff, staff of other agencies, private consultants and/or other designated representatives of the State to evaluate the proposals' technical merits. During the evaluation process, all proposals will be kept confidential.

Technical Evaluation Committee

Proposals that pass the initial screening according to the Proposal Requirements and Proposal Guidelines will be scored by the Technical Evaluation Committee which will be composed by a minimum of three technical evaluators. Technical evaluators may be from academia, environmental organizations, industry, or government. The identity of the evaluators will be kept confidential during the selection process. The Energy Commission reserves the right to solicit technical input from other internal and external sources. This technical input will be utilized by the Technical Evaluation Committee during the evaluation of the proposals.

Scoring and Selection Process

Each proposal will be scored by the Technical Evaluation Committee utilizing the following process:

1. Each Committee Member will independently score each proposal from zero (0) to ten (10) for each criterion described in the next section, based upon the information provided by the Applicant's proposal.
2. Each criterion score will then be multiplied by the specified weighting factor to obtain the weighted points for that criterion.
3. The weighted points for each proposal will be summed to provide each Committee Member's total weighted score.
4. The final score for each proposal will be the average score of all Committee Members.

Out of 100 total possible points, a Proposal must garner a minimum of 70 points to pass technical evaluation. The passing Proposals will then be rank-ordered by their scores and the list will be submitted to the Energy Commission Research and Development and Demonstration (RD&D) Committee for funding recommendation. Recommended awards must be approved by the full Energy Commission at an Energy Commission Business Meeting.

Scoring Scale
Each proposal will be scored on the degree to which it meets each of the Technical Evaluation Criteria, as shown in the table below.

0	Not responsive to the criterion
1-2	Response is minimal
3-4	Responds only marginally to relevant considerations under the criterion
5-6	Responds satisfactorily to most relevant considerations under the criterion
7-8	Responds satisfactorily to all relevant considerations under the criterion
9	Responds completely, accurately, and convincingly to all relevant considerations under the criterion
10	Response is complete, specific, and superior, both quantitatively and qualitatively

Technical Evaluation Criteria
The Technical Evaluation Committee will score each Proposal based on the following five Technical Evaluation Criteria:

1) Proposal Responds to the Targeted Research Areas as Described in the Applicable Targeted Research Areas (see Attachment F). (Weighting Factor: 1.5; Maximum Weighted Score: 15)

- Proposal contains a discussion of the previous work in the proposed research area.
- Proposal's scope of research is adequate and methodology is appropriate for the chosen Targeted Research Area.
- Proposal convincingly justifies the significance of the proposed research. Proposal identifies technological and/or policy barriers and options to overcome these barriers.

2) Proposed Research Identifies Clear, Meaningful, and Measurable Objectives. (Weighting Factor: 1.5; Maximum Weighted Score: 15)

- The proposal lists and describes clear, meaningful, and measurable objectives that will achieve the tasks required in addressing the applicable Targeted Research Area and California Buildings Energy problem.
- The results of the research lead to significant reductions in the energy consumed and peak demand in residential and/or commercial buildings in California.
- The research method is appropriate for achieving the project's objectives and goals.

3) The Project Description, Work Statement, Products and Due Dates, and Budget are Clear, Reasonable and Appropriate. (Weighting Factor: 2.0; Maximum Weighted Score: 20)

- Degree to which the proposal is clearly written and internally consistent.
- Project Description, Work Statement, and Task Budgets demonstrate a clear, reasonable, appropriate and complete effort.
- Work Statement and Task Budgets are composed of a series of interconnected, logical, and discrete tasks.
- Work Statement and Task Budgets lay out an approach and plan that is practical and feasible for accomplishing the stated objectives. The Work Schedule reasonably appropriates time and funds with respect to the sequences of tasks, level of effort allocated per task, and the use of labor, equipment, and facilities. If the research involves a particular environmental aspect – the schedule fits the necessary time of year to conduct the research.
- Each item of the budget is appropriate considering: (1) the significance of the barriers, issues, and/or knowledge gaps being addressed, (2) the project's objectives and goals, and (3) the level of effort described in the Project Narrative.
- The budgets show that key personnel will be committed to the project for the appropriate number of hours and functions to accomplish the tasks and products, and for the activities described in the Project Narrative.
- The amount and type (e.g., cash and in-kind) of pledged match funds, if any.

4) The Principal Investigator and the Project Team are Well Qualified to Conduct the Project. (Weighting Factor: 2.5; Maximum Weighted Score: 25)

- The Proposal describes in detail, with substantiation, the Applicant's past and current work in the Targeted Research Area. Accomplishments (not just activities) are described.
- Publishing track record in peer-reviewed journals.
- The proposal convincingly demonstrates, based on education, training, and past experience that the applicant and project team are capable of conducting all technical, administrative, and budgetary functions and responsibilities, including the ability to control cost, maintain the schedule, and report results and accomplishments in an effective manner.

5) Overall Technical Merit and Degree to Which the Project is Likely to Succeed. (Weighting Factor: 2.5; Maximum Weighted Score: 25)

- Originality of the research idea and methodological approach.
- Importance of the R&D within the context of the overall scientific advancement in the given subject.

- The Proposal's research scope expands on what is suggested in the Targeted Research Area description, thereby exploring/providing preliminary answer(s) to the next logical step for future research. To the reviewer's understanding, the likelihood that this project is feasible and is likely to succeed in terms of satisfactory completion within the project timeframe and budget, and producing scientifically meaningful as well as policy-relevant results.
- The proposed work will advance science and/or technology and justified by comparisons to the current state of the art.
- Proposal provides a market connection or a pathway to achieve market adoption for the proposed technology and a potential benefit to electricity ratepayers in California.
- Proposal provides sufficient information to assess technical merit and the potential impact the research results would have on the targeted energy problem.

Attachment H

Sample PIER Terms and Conditions

Applicants should refer to the Sample PIER Terms and Conditions which are posted at www.energy.ca.gov/contracts as part of this solicitation package. Applicants are encouraged to review and ensure that the Terms and Conditions are acceptable prior to applying for funding under this solicitation.

Attachment I

Prevailing Wage Special Condition Template

PUBLIC WORKS AND PAYMENT OF PREVAILING WAGE

A. Recipient/General Requirements

1. Recipient shall comply with state prevailing wage law, Chapter 1 of Part 7 of Division 2 of the Labor Code, commencing with Section 1720 and Title 8, California Code of Regulations, Chapter 8, Subchapter 3, commencing with Section 16000, for any "public works" (as that term is defined in the statues) performed on the Project funded by this Agreement. For purpose of compliance with prevailing wage law, the Recipient shall comply with provisions applicable to an awarding body. Compliance with state prevailing wage law includes without limitation: payment of at least prevailing wage as applicable; overtime and working hour requirements; apprenticeship obligations; payroll recordkeeping requirements; and other obligations as required by law.

2. Recipient shall certify to the Energy Commission on each Payment Request Form, that prevailing wages were paid to eligible workers who provided labor for work covered by the payment request and that the Recipient and all contractors complied with prevailing wage laws. Prior to the release of any retained funds under this Agreement, the Recipient shall submit to the Energy Commission a certificate signed by the Recipient and all contractors performing public works activities stating that prevailing wages were paid as required by law.

B. Flowdown Requirements

Recipient shall ensure that all agreements with its contractors to perform work related to this Project contain the following provisions:

1. Contractor shall comply with state prevailing wage law, Chapter 1 of Part 7 of Division 2 of the Labor Code, commencing with Section 1720; and Title 8, California Code of Regulations, Chapter 8, Subchapter 3, commencing with Section 16000, for all construction, alteration, demolition, installation, repair or maintenance work over $1,000 performed under the contract. Contractor's obligations under prevailing wage laws include without limitation: pay at least the applicable prevailing wage for public works activities performed on the Project; comply with overtime and working hour requirements; comply with apprenticeship obligations; comply with payroll recordkeeping requirements; and comply with other obligations as required by law.

2. Contractor shall ensure that the above requirements are included in all its contracts and any layer of subcontracts for activities for the Project.

Attachment J

Prevailing Wage Compliance Certificate

Applicants should refer to the Prevailing Wage Compliance Certificate which is posted at www.energy.ca.gov/contracts as part of this solicitation package. If awarded a funding agreement that is subject to prevailing wages, this form will need to be completed and signed at the end of the Agreement term.

Attachment K

Prevailing Wage Compliance Questions and Answers

1. Is Payment of Prevailing Wage Required?

Yes. Any Recipient whose project involves "public works" as the term is defined in defined in Chapter 1 of Part 7 of Division 2 of the Labor Code, commencing with Section 1720, must pay prevailing wages in accordance with the law.

2. Does prevailing wage apply to private entities?

Yes. A private entity must pay prevailing wage under California law if the project involves public works.

3. How do I know if my project involves public works?

The California Labor Code beginning at section 1720 deals with this issue. Labor Code sections 1720 and 1771 define public works as:

- Construction (includes work performed during the design and preconstruction phases of construction including but not limited to, inspection and land surveying work).
- Alteration
- Demolition.
- Installation.
- Repair work.
- Maintenance work.

These Labor Code sections can be found online at http://www.leginfo.ca.gov/calaw.html.

Below are some examples (this list is not exhaustive) of the types of activities that typically lead to finding that a project is a public work:

- Cement work such as pouring a cement pad.
- Site preparation such as grading.
- Surveying.
- Electrical work such as wiring.
- Carpentry work.
- Limited inspection activities.

4. What kind of trades or workers must be paid prevailing wage?

The California Department of Industrial Relations (DIR) Division of Labor Statistics and Research (DLSR) makes the final determination on which trades and/or workers are covered by prevailing wage laws. DLSR maintains a list of the covered trades/workers that are entitled to prevailing wage for public works commercial construction projects. See www.dir.ca.gov/dlsr/statistics_research.html or call the DLSR Prevailing Wage Hotline (415) 703-4774 for more information about these trades.

Generally, workers such as the following would be covered trades:

- Operating engineer (heavy equipment operator)
- Surveyor
- Carpenter
- Cement Mason
- Electrician
- Laborer

The following types of workers usually would NOT be covered trades entitled to prevailing wage:

- Engineer
- Project superintendent / construction manager / project manager
- Architect
- Planner
- Computer programmer

The above examples are for general information only. If you have questions about whether a worker is in a covered trade requiring payment of prevailing wages, you should check directly with DIR.

5. What if I am unsure whether my project involves public works and prevailing wage must be paid? How Should I Budget if I am Unsure About Prevailing Wage?

You are encouraged to determine if your project involves public works as soon as possible. In order to determine if your project is a public work, you will need to contact the California Department of Industrial Relations (DIR). They can be reached at (415) 703-4774. If you do not know whether your project is a public work and you have not obtained a determination from DIR that the project is not a public work, you must budget with the assumption that the project is a public work and comply with the prevailing wage laws, including but not limited to the payment of prevailing wages.

On the budget, please indicate whether your budget includes amounts for the payment of prevailing wage. You must indicate "yes" unless you have received a determination from DIR that the project is not a public work.

If you do not budget for prevailing wage, and it is later determined that the project involves public works and prevailing wage must be paid, you may be liable for damages and penalties. You also cannot later increase your grant award if it is determined that prevailing wages apply and increase project costs higher than budgeted. The amount requested in your proposal is the maximum that will be paid. Any increased costs for payment of prevailing wage must be paid with match funds. The Energy Commission's grant award amount does not change or increase if the applicant's costs increase for any reason.

6. How do I get assistance in determining whether the project involves public works?

First, call the DLSR Prevailing Wage Hotline, (415) 703-4774. The Prevailing Wage Hotline can frequently give advice quickly on routine questions. If the Prevailing Wage Hotline is unable to answer your question, you will need to write to the Director of DIR for a coverage determination on whether your project involves public works. You would include all the relevant facts and documents related to the project. DIR regulations, Title 8 California Code of Regulations, section 16001(a)(1), provides that any interested party may file a request with the Director of DIR to determine coverage under the prevailing wage laws. The request can be either for a specific project or type of work to be performed that the interested party believes may be subject to or excluded from coverage as public works under the Labor Code. The full text of DIR's regulations can be found at: http://ccr.oal.ca.gov, (Title 8, Division 1, Chapter 8, Subchapter 3, Article 2). Send requests for a coverage determination to:

Department of Industrial Relations
Office of the Director
455 Golden Gate Avenue
San Francisco CA 94102

7. How long will it take to get an answer?

We do not know, but hope that the question can be asked and answered informally and quickly through the Prevailing Wage Hotline. If you need to submit a request to the Director of DIR, it will take longer to get a coverage determination.

8. What happens if I make a request to DIR but do not have a decision, or am still unsure whether prevailing wage must be paid, by the time the Energy Commission makes an award at a business meeting, or by the time I execute the grant agreement?

In this case, the Energy Commission would execute a grant agreement with a budget that assumes prevailing wage is required. If the Recipient, prior to performing the activities in question, then receives a determination from DIR that the project is not a public work, then the Energy Commission can execute an amendment with the Recipient to decrease the budget accordingly. The prevailing wage terms and conditions can also be removed.

9. What if I submit a proposal to the Energy Commission with a project that I say is not a public work, and the Energy Commission believes that it might be a public work? How would we resolve our differences?

We would request that you first call the Prevailing Wage Hotline. If you do not receive an answer, we would request that you write a letter to DIR and ask DIR to make the decision. If DIR says the project is a public work, then you will need to pay prevailing wages. If you do not obtain a DIR determination that the project is not a public work requiring the payment of prevailing wage, then you must assume that the project is a public work and comply with the prevailing wage laws, including paying prevailing wages.

10. If my project is a public work, how do I know what prevailing wages are required in order to prepare a budget?

If your project is a public work, please submit your budget with the applicable prevailing wage for each trade entitled to prevailing wage as determined by DLSR. For prevailing wage rate information for commercial projects, see www.dir.ca.gov/dlsr/statistics_research.html or call the Prevailing Wage Hotline (415) 703-4774. If your project involves residential construction, the rates are not listed on DIR's website, and you must call the DLSR Prevailing Wage Hotline.

11. What do I do if workers will be used who do not fit neatly into one of the categories on the DIR website?

Contact DLSR and describe the type of trade you anticipate will be required in your project and ask whether there is an existing prevailing wage already set by DLSR.

12. Does prevailing wage apply to a public entity that performs project work with its own employees?

No.

13. If my project is considered a public work, then are there any special requirements?

Yes. For example, the grantee must make sure that covered workers are paid prevailing wage. There are other requirements, such as keeping payroll records, complying with working hour requirements, and apprenticeship obligations. See the Labor Code and the sample terms and conditions, Special Condition regarding Prevailing Wage.